We claim:

1. An ultrasonic system for multiple transmission angle ultrasonic interrogation in tissues with heterogenous structures that alter ultrasonic properties, comprising:
   a) a first ultrasonic transducer with an axis of transmission in common with a second ultrasonic transducer, said axis of transmission is through a portion of a tissue,
   b) an x, y positioner that engages said first ultrasonic transducer and said second ultrasonic transducer, said x, y positioner controllably 1) positions said first ultrasonic transducer and said second ultrasonic transducer in a desired manner between at least a first and a second position while generally maintaining said axis of transmission and 2) establishes predetermined transmission angles for said first ultrasonic transducer and said second ultrasonic transducer to interrogate said portion at multiple transmission angles through heterogenous structures in said portion, and
   c) a computational unit designed to manage ultrasonic signal transmission and reception of said first ultrasonic transducer and said second ultrasonic transducer with either BUA or SOS or both and may optionally be designed to control movement of said x, y positioner;

   wherein said ultrasonic measurements with multiple transmission angles are improved compared to the absence of multiple transmission angles.
2. The ultrasonic system of claim 1, further comprising a z positioner that positions at least one of said first or second ultrasonic transducers, and said z positioner changes the distance of transmission along said axis of transmission between said first ultrasonic transducer and said second ultrasonic transducer.
3. The ultrasonic system of claim 2, wherein said computational unit can estimate broadband ultrasonic attenuation at multiple transmission angles.
4. The ultrasonic system of claim 3, wherein said x, y positioner can establish at least three predetermined transmission angles.
5. The ultrasonic system of claim 4, wherein said transmission angles vary overall by at thirty degrees.
6. The ultrasonic system of claim 1, wherein said first transducer and said second transducer can transmit and receive signals to change the direction of transmission

between said first transducer and said second transducer to reduce ultrasonic artifacts due to variations in tissue interposed along the transmission path.

7. The ultrasonic system of claim 6, wherein said x, y positioner comprises a frame to maintain said axis of transmission between said first and second ultrasonic transducers, said frame engages an x track and said x track engages a y track, thereby an operator can move said first and second ultrasonic transducers manually in either an x or y dimension or combination thereof with respect to an anatomical region.
8. The ultrasonic system of claim 7, wherein said x, y positioner can accommodate an appendage and said appendage is held in a predetermined position in said ultrasonic system relative to said x, y positioner.
9. The ultrasonic system of claim 1, wherein said x, y positioner is automatically controlled by said computational unit.
10. The ultrasonic system of claim 9, wherein said computational unit comprises a computational program to calculate BUS or SOS or both at multiple transmission angles.
11. The ultrasonic system of claim 10, wherein said computational unit is designed to instruct said x, y positioner to position said first ultrasonic transducer and said second ultrasonic transducer to interrogate said tissue with respect to an anatomic landmark and said x,y positioner generally maintains said axis of transmission between said first ultrasonic transducer and said second ultrasonic transducer at a preselected set of coordinates in relation to said anatomic landmark.
12. The ultrasonic system of claim 10, wherein said computational unit is designed to remove or filter interference or scatter detected at multiple transmission angles.
13. The ultrasonic system of claim 11, wherein said anatomic landmark is part of an anatomical region selected from the group consisting of a knee, an ankle, and tibia, and further wherein said x, y positioner is adapted to accommodate said anatomical region and said first ultrasonic transducer and said second ultrasonic transducer are adapted for interrogation using broadband ultrasonic attenuation of dense tissue comprising bone.
14. The ultrasonic system of claim 1, wherein said computational unit can 1) average signals from multiple transmission angles and 2) instruct said x, y positioner to a

position over said anatomic landmark, thereby said first ultrasonic transducer and second ultrasonic transducer have an axis of transmission generally through said anatomic landmark.

15. An ultrasonic system for automated ultrasonic measurements at multiple transmission angles, comprising:
   a) an ultrasonic transducer unit comprising 1) an ultrasonic transducer that can transmit and receive signals and 2) a multiple transmission angle positioner to vary the transmission angle of said ultrasonic transducer with respect to the plane of a tissue in a predetermined fashion and with necessarily changing the general position of said ultrasonic transducer with respect to said tissue, and
   b) a computational unit designed to manage ultrasonic signal transmission and reception of said ultrasonic transducer unit and to process signals from said ultrasonic transducer unit using multiple transmission angles.
16. The ultrasonic system of claim 15, wherein said computational unit is designed to average ultrasonic signals received from said ultrasonic transducer unit using multiple transmission angles.
17. The ultrasonic system of claim 15, wherein said computational unit is further designed to process received ultrasonic signals from said ultrasonic transducer to generate at least one data set of an ultrasonic property determined at predetermined, multiple transmission angles.
18. The ultrasonic system of claim 17, wherein said ultrasonic property is selected from the group consisting of broadband ultrasonic attenuation, echogenicity, reflective surfaces, distances from said transducer unit, speed of sound, ultrasonic images, and Doppler information.
19. The ultrasonic system of claim 18, wherein said computational unit is further designed to compare ultrasonic signals at predetermined, multiple transmission angles to determine artifact pattern(s) or location(s) of anatomical structures.
20. The ultrasonic system of claim 16, wherein said computational unit directs a positioning unit to position said transducer unit with reference to an anatomical landmark.

21. The ultrasonic system of claim 20, wherein said computational unit is designed to instruct said transducer unit to transmit and receive signals after positioning said transducer unit with respect to said anatomical landmark.

22. The ultrasonic system of claim 17, wherein said computational unit further comprises a display for showing ultrasonic properties as a function of predetermined, multiple transmission angles.

23. The ultrasonic system of claim 17, wherein said ultrasonic system further comprises a positioning unit for changing the spatial relationship between an anatomic landmark in an anatomical region and said ultrasonic transducer unit, thereby permitting interrogation with reference to said anatomic landmark in said anatomical region by positioning said transducer unit with respect to said anatomical landmark.

24. The ultrasonic system of claim 15, wherein said multiple transmission angle positioner is not a C arm unit or can be engaged in frame that offers multiple position at different anatomical regions.

25. The ultrasonic system of claim 15, wherein said multiple transmission angle positioner maintains said ultrasonic transducer unit in substantially the same anatomical region while varying transmission angles of said ultrasonic transducer unit positioner.

26. The ultrasonic system of claim 23, wherein said system is adapted for an ankle.

27. An ultrasonic system for tissue ultrasonic interrogation for broadband ultrasonic attenuation, comprising:

a) a first ultrasonic transducer with an axis of transmission through an anatomical region to be interrogated and said first ultrasonic transducer is adapted for BUA,

b) a second ultrasonic transducer with said axis of transmission through said anatomical region to be interrogated and adapted for BUA, wherein monitoring broadband ultrasonic attenuation between said first ultrasonic transducer and said second ultrasonic transducer is permitted,

c) a positioning unit to vary the transmission angle of the axis of transmission with respect to said, and

d) a computational unit designed to manage ultrasonic signal transmission of said first ultrasonic transducer, to manage ultrasonic signal reception of said second

ultrasonic transducer and to control the transmission angle of the axis of transmission.

28. The ultrasonic system of claim 27, wherein said positioning unit comprises an x,y positioner for said first ultrasonic transducer and said second ultrasonic transducer at can establish at least 3 predetermined transmission angles.

29. The ultrasonic system of claim 27, wherein said x,y positioner is designed to position said first ultrasonic transducer and said second ultrasonic transducer, wherein said first axis of transmission at each transmission angle generally passes through the same anatomical region that is no more than about 5 to 8 cm squared.

30. The ultrasonic system of claim 28, wherein said computational unit comprises a program to generate an anatomic landmark at multiple transmission angles and said positioning unit comprises a z positioner controlled by said computational unit.

31. An ultrasonic method for ultrasonic interrogation, comprising:

a) positioning, with respect to an anatomical region suspected of having tissue heterogenity that causes variations in acoustic properties, an ultrasonic transducer unit comprising either 1) a first ultrasonic transducer that can transmit and receive signals or 2) a pair of ultrasonic transducers where a first member of said pair is designed to transmit signals and a second member of said pair is designed to receive signals,

b) interrogating said anatomical region with said ultrasonic transducer unit at predetermined, multiple transmission angles, and

c) recording an ultrasonic property of said anatomical region, and

d) storing said ultrasonic property in a storage device.

32. The ultrasonic method of claim 31, further comprising the steps of comparing ultrasonic signals at different predetermined, multiple transmission angles.

33. The ultrasonic method of claim 31, wherein steps a, b, and c are repeated and each positioning step is performed in relation to an anatomic landmark.

34. The ultrasonic method of claim 33, wherein said positioning steps are performed to generate an axis of transmission substantially through said anatomic landmark.

35. The ultrasonic method of claim 34, wherein said positioning steps are performed in relation to a reference anatomic landmark of said anatomical region stored in retrievable form in a storage device.

36. An ultrasonic method for determining broadband ultrasonic attenuation or speed of sound measurements in dense tissues, comprising:

a) interrogating a tissue at predetermined, multiple transmission angles with an ultrasonic transducer unit adapted for either 1) broadband ultrasonic attenuation or 2) speed of sound measurements or both,

b) determining dense tissue broadband ultrasonic attenuation, dense tissue speed of sound or both at two or more predetermined, multiple transmission angles,

wherein said determining step generates a dense tissue broadband ultrasonic attenuation value, dense tissue speed of sound value or both that is more indicative of broadband ultrasonic attenuation or speed of sound in dense tissue than interrogation in the absence of predetermined, multiple transmission angles.

37. The ultrasonic method of claim 36, wherein said determining step further comprises determining either 1) broadband ultrasonic attenuation or 2) speed of sound in said tissue or both at five or more predetermined transmission angles.

38. The ultrasonic method of claim 36, wherein said determining step further comprises adjusting either 1) broadband ultrasonic attenuation, 2) speed of sound in said tissue or 3) both for differences in the transmission path at two or more predetermined transmission angles.

39. The ultrasonic method of claim 36, wherein said tissue comprises a heel.

40. The ultrasonic method of claim 39, wherein said determining step further comprises calculating speed of sound for transmission in at least two different transmission directions.

41. An ultrasonic method for generating an anatomic landmark for ultrasonic interrogation of an anatomical region, comprising:

a) positioning, if necessary, on the surface of a patient, with respect to an anatomical region, an ultrasonic transducer unit comprising either 1) a first ultrasonic transducer that can transmit and receive signals or 2) a pair of ultrasonic

transducers wherein a first member of said pair is designed to transmit signals and a second member of said pair is designed to receive signals, and

b) interrogating said anatomical region with said ultrasonic transducer unit at a first transmission angle,

c) interrogating said anatomical region with said ultrasonic transducer unit at a second transmission angle,

d) identifying an anatomic landmark in common with the signals obtained in steps (b) and (c) in said anatomical region with an ultrasonic property of said anatomical region.

42. The ultrasonic method of claim 41, further comprising the step of storing said anatomic landmark in a storage device, and wherein positioning is through a positioning unit and said transducer unit has a plurality of predetermined transmission angles for interrogation and said second transmission angle increases the accuracy of said anatomical landmark compared to interrogation with a single transmission angle.

43. The ultrasonic method of claim 41, wherein said anatomic landmark was not previously identified in said patient.

44. The ultrasonic method of claim 41, wherein said positioning is automated and not hand held and steps b through c are repeated automatically by a computational unit.

45. An ultrasonic method for determining broadband ultrasonic attenuation or speed of sound measurements in dense tissues, comprising:

a) interrogating a patient's tissue with at least a first ultrasonic transducer unit at a first transmission angle and a second ultrasonic transducer unit at a second transmission angle, wherein said first ultrasonic transducer unit and said second ultrasonic transducer unit are a) adapted for either 1) broadband ultrasonic attenuation or 2) speed of sound measurements or both and b) have an angle of least about 150 degrees between said first ultrasonic transducer unit and said second transducer unit,

b) interrogating said patient's tissue with said first ultrasonic transducer unit at a third transmission angle and said second ultrasonic transducer unit a fourth transmission angle while maintaining an angle of at least about 150 degrees between said first transducer unit and said second transducer unit, and

c) determining dense tissue broadband ultrasonic attenuation, dense tissue speed of sound or both for said tissue;

wherein said determining step generates a dense tissue broadband ultrasonic attenuation value, dense tissue speed of sound value or both that is more indicative of broadband ultrasonic attenuation or speed of sound in dense tissue than in the absence of interrogating said patient's tissue with at least said first ultrasonic transducer unit at a third transmission angle and said second ultrasonic transducer unit a fourth transmission angle.

46. The ultrasonic method of claim 45, further comprising the steps of:

d) transmitting ultrasonic pulses into said tissue with said first ultrasonic transducer unit and receiving ultrasonic signals with said second ultrasonic transducer unit, and

e) correcting dense tissue broadband ultrasonic attenuation, dense tissue speed of sound or both for soft tissue acoustic variations,

wherein said correcting step generates a dense tissue broadband ultrasonic attenuation value, dense tissue speed of sound value or both that is more indicative of broadband ultrasonic attenuation or speed of sound in dense tissue than in the absence of correcting for soft tissue acoustic variations.

47. The ultrasonic method of claim 45, wherein said first ultrasonic transducer unit and said second ultrasonic transducer unit have a common axis of transmission in at least one step.

48. The ultrasonic method of claim 47, wherein said first ultrasonic transducer unit and said second ultrasonic transducer unit have a common axis of transmission in at least step (a) or (b) and said first ultrasonic transducer and a said second ultrasonic transducer unit have a common axis of transmission through an anatomical region that is non-orthogonal with respect to the tissue plane by about 5 to 20 degrees.

49. The ultrasonic method of claim 48, wherein said anatomical region includes the calcaneus.

50. The ultrasonic method of claim 47, wherein said step (a) includes transmitting ultrasonic waves for a first time duration and step (b) includes transmitting ultrasonic

waves for a second time duration, wherein difference in said first time duration and said second time duration is not more than about 1,000 ms.

51. The ultrasonic method of claim 47, wherein said step (e) includes averaging BUA values obtained from (1) said first and second transmission angles and (2) said third and fourth transmission angles and comparing averaged BUA values from (1) with averaged BUA values from (2) to determine the highest or lowest BUA value.

52. The ultrasonic method of claim 47, wherein said step (e) includes averaging SOS values obtained from (1) said first and second transmission angles and (2) said third and fourth transmission angles and comparing averaged SOS values from (1) with averaged SOS values from (2) to determine the highest or lowest SOS value.

53. The ultrasonic method of claim 47, wherein said first and second transmission angles are robotically established and (2) said third and fourth transmission angles are robotically established.

54. The ultrasonic method of claim 47, wherein said interrogating in steps (b) and (c) further comprises generating said first and second transmission angles at a first time point with a means for generating a transmission angle and generating said third and fourth transmission angles at a second time point with said means for generating a transmission angle.

55. The ultrasonic method of claim 54, wherein said first time point and said second time point are separated by a predetermined length of time instructed by a computational unit.

56. The ultrasonic method of claim 47, wherein said first and second transmission angles establish a first common axis of transmission between said first ultrasonic transducer and said second ultrasonic transducer and said third and fourth transmission angles establish a second common axis of transmission between said first ultrasonic transducer and said second ultrasonic transducer; further wherein said first common axis of transmission and second common axis of transmission are generally through a single interrogation site of an anatomical region and have substantially more than about a 10 degree difference with respect to a common plane of said anatomical region.

57. An ultrasonic system for determining broadband ultrasonic attenuation or speed of sound measurements in a tissue, comprising:

a) a transducer unit comprising at least a first ultrasonic transducer engaged with a first multiple transmission angle unit to controllably vary first transmission angles and a second ultrasonic transducer engaged with a second multiple transmission angle unit to controllably vary second transmission angles, wherein said first ultrasonic transducer unit and said second ultrasonic transducer unit are adapted for either 1) broadband ultrasonic attenuation or 2) speed of sound measurements or both, and

b) a computational unit for controllably adjusting transmission angles of said first and second transducer;

wherein said ultrasonic system will measure broadband ultrasonic attenuation value, speed of sound value or both if so desired.

58. An ultrasonic system of claim 57, further comprising an ultrasonic transducer to determine soft tissue thickness in an anatomical region and a means for correcting dense tissue broadband ultrasonic attenuation, dense tissue speed of sound or both for said soft tissue thickness.

59. A computer program product, comprising:

a) instructions for a positioning unit to vary the transmission angle of a transducer or plurality of transducers at a plurality of transmission angles in an anatomical region,

b) instructions for interrogating said anatomical region with said transducer or said plurality of transducers at said plurality of transmission angles, and

c) instructions for recording at least one ultrasonic property at said plurality of transmission angles,

wherein instructions (a) through (c) facilitates a clinically relevant measurement and instructions (a) through (c) are stored on a computer retrievable medium.

60. The computer program product of claim 61, further comprises:

f) instructions for comparing ultrasonic singals at a plurality of transmission angles.

61. The computer program product of claim 61, wherein said clinical measurement is BUA or SOS.

62. The computer program product of claim 61, wherein said clinical measurement is echogencity, reflective surface or ultrasonic image information.

63. The computer program product of claim 61, wherein said clinical measurement is tissue and flow information obtained after administration of ultrasonic contrast agents.